

# CLAIMS

1. A method of bleaching cellulose pulp in a bleaching line, having at least two bleaching steps comprising a first ( $D_1$ ) and a second ( $D_2$ ) bleaching step, as seen in the direction of flow of the cellulose pulp, which bleaching steps have wash apparatuses ( $W_4, W_5$ ) for the pulp arranged after the first and the second bleaching step, respectively, and in which wash liquor and where appropriate dilution liquor is led in principle in counter-current to the pulp flow through the bleaching steps in the bleach line, characterised in that a substantial portion of the wash liquor, or all of it, is supplied by means of a main conduit (1), wherein
  - each one of said wash apparatuses ( $W_4, W_5$ ) is independently supplied by means of first branch conduits ( $L_1, L_3$ ) connected to said main conduit (1),
  - each one of said wash apparatuses ( $W_4, W_5$ ) independently bleeds out wash filtrate by means of second branch conduits ( $L_2, L_4$ ) connected to said main conduit (1), and said main conduit has an outlet end (10) which bleeds out at least some of said wash filtrate from said wash apparatus ( $W_4, W_5$ ).
2. A method according to claim 1, characterised in that said main conduit has an inlet end which under steady state conditions continuously is fed with wash liquid and an outlet end (10) which under steady state conditions continuously bleeds out at least some of said wash filtrate from said main conduit.
3. A method according to claim 2, characterised in that the inlet and outlets ends are arranged at opposite ends of the main conduit with said branch conduits connected to the main conduit inbetween the inlet and the outlet.
4. A method according any of the above claims, characterised in that the main conduit is connected to receive and distribute filtrate that is mainly acidic or mainly alcalic.
5. A method according to claim 4, characterised in that there are two main conduits, one to receive and distribute mainly alkaline filtrate and one to receive and distribute mainly acidic filtrate.
6. A method according to any preceding claim, characterised in that upstream a first branch position (A1) in the upstream end of the main conduit (1), a main pressurising device (P20) is provided which supplies fresh wash liquid and

pressurises the main conduit and establishes a basic flow in the main conduit in a direction in the main conduit in reverse to the formed flow of cellulose pulp in the bleaching line, wherein preferably said pressurising device being located connected to the main conduit at a position at the opposite end in the main conduit in relation to the outlet end (10).

7. A method according to any preceding claim, characterised in that said filtrate is led to the main conduit (1), via a pump device (P21'; P22').
8. A method according to any preceding claim, characterised in that the pressure within the main conduit (1) is maintained at a pressure of at least 0,5 bar above atmospheric pressure.
9. A method according to claim 8, characterised in that the pressure within the main conduit is maintained, during steady state, at a pressure below 3 bar, preferably within the range of 1 – 2 bars pressure above atmospheric pressure.
10. A method according to claim 9, characterised in that wash liquor is led from the main conduit to the respective wash apparatuses (W<sub>5</sub>, W<sub>4</sub>) via each respective supply line (L<sub>1</sub>A, L<sub>3</sub>A), by means of a pump devices (P21, P22).
11. A method according to claim 9 or 10, characterised in that dilution liquid to at least one position of the bleach line is supplied directly via a branch line (L<sub>1</sub>B) connected to the main conduit (1).
12. A method according to claim 8, characterised in that the pressure in said main conduit, during steady state, is maintained within the range 3 – 20 bar, preferably 4 – 10 bar, more preferred about 5 – 6 bar above atmospheric pressure, whereby in the preferred mode supply pumps for wash filtrate may be dispensed with.
13. A method according to any preceding claim, characterised in that an intermediate bleach step (EO-EOP) is provided intermediate said at least two bleach steps, which bleach step has an opposite pH-level compared to said two bleach steps, wherein at least a portion of the filtrate from a wash apparatus (W<sub>3</sub>) belonging to said intermediate stage is not taken back to the main conduit (1).

14. A method according to claim 1, characterised in that the outlet (10) is controlled by a pressure and/or flow controlling valve.
15. A method according to claim 14, characterised in that said pressure and flow control valve, can achieve feed back control of the main pressurising device (P20) to secure a predetermine pressure and/or flow through the main conduit (1).
16. A method according to claim 15, characterised in that the flow at said outlet, during steady state, is within the range  $0,1 - 12 \text{ m}^3$ , preferably normally within  $0,5 - 10 \text{ m}^3$ .
17. A bleaching line for bleaching cellulose pulp in a bleaching line, having at least two bleaching steps comprising a first ( $D_1$ ) and a second ( $D_2$ ) bleaching step, as seen in the direction of flow of the cellulose pulp, which bleaching steps have wash apparatuses ( $W_4, W_5$ ) for the pulp arranged after the first and the second bleaching step, respectively, and in which wash liquor and where appropriate dilution liquor is led via lines ( $L_1, L_3; L_1A, L_3A$ ) in principle in counter-current to the pulp flow through the bleaching steps in the bleach line, characterised in that there is arranged a main conduit (1) to supply a substantial portion of the wash liquor, or all of it, wherein
- each one of said wash apparatuses ( $W_4, W_5$ ) is independently connected to said main conduit (1) by means of first branch conduits ( $L_1, L_3$ ),
  - each one of said wash apparatuses ( $W_4, W_5$ ) is independently connected to said main conduit (1) to bleed out wash filtrate by means of second branch conduits ( $L_2, L_4$ ), and
- said main conduit is arranged with an outlet end (10) to bleed out at least some of said wash filtrate from said wash apparatus ( $W_4, W_5$ ).
18. A bleaching line according to claim 17, characterised in that the outlet end is arranged opposite an inlet end of the main conduit, with said branch conduits ( $L_1, L_3; L_2, L_4$ ) connected to the main conduit inbetween the inlet end and the outlet end (10).
19. A bleaching line according to claim 17 or 18, characterised in that there are two main conduits, one to receive and distribute mainly alkaline filtrate and one to receive and distribute mainly acidic filtrate.

20. A bleaching line according to any of claims 17 - 19, characterised in that upstream a first branch position (A1) in the upstream end of the main conduit (1), a main pressurising device (P20) is provided to supply fresh wash liquid and to pressurise the main conduit (1).
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21. A bleaching line according to any of claims 17 - 20, characterised in that a pump device (P21'; P22') is arranged within at least one of said branch conduits (L<sub>2</sub>, L<sub>4</sub>) to pump said filtrate to the main conduit (1).
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22. A bleaching line according to any of claims 17 - 21, characterised in that there is arranged at least one branch line (L<sub>1</sub>B) connected to the main conduit (1), to supply dilution liquid to at least one position of the bleach line.
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23. A bleaching line according to any of claims 17 - 22, characterised in that the outlet (10) is arranged with a control device, preferably in the form of a pressure and/or flow controlling valve.
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24. A bleaching line according to claim 23, characterised in that said control device and/or said main pressurising device (P20) is connected to a pressure sensing device (PC) to control pressure and/or flow in the main conduit (1).